

**Lake Trout Task Group Report  
Lake Michigan Committee Meeting  
March 21, 2007- Ypsilanti, Michigan**

This report provides a brief overview of the status of lake trout populations and restoration efforts in Lake Michigan. It is intended to provide a quick, graphical representation of pertinent data, and is structured around the population objectives articulated in *A Lake trout Restoration Plan for Lake Michigan, 2005-2020* (Bronte et al. *in review*), which is currently under review by the Lake Michigan Committee (LMC). Those objectives generally follow the ontogeny of lake trout and contain established population benchmarks that are important steps to increase the probability of significant and sustained natural reproduction by hatchery-reared fish. Graphical presentations provide current measures within a time series (when available) and compared to a target value as a gauge of progress towards restoration.

**Goal:** Reestablish genetically diverse populations of lake trout that are composed predominately of wild fish that are able to sustain fisheries.

Objective 1 (Increase genetic diversity): By 2007, and until restoration has been achieved, increase the genetic diversity of lake trout through the introduction of morphotypes adapted to deep, offshore areas while continuing to stock shallow-water morphotypes.

**Result:** Klondike Reef strain from Lake Superior has been recommended for introduction to occupy deepwater habitats but no decision has been made by LMC.

Objective 2 (Increase overall abundance): By 2012, achieve in refuges and high-priority areas, catch-per-effort > 25 lake trout/1000 feet of graded mesh (2.5-6.0 inch) gill net lifted during spring stock assessments. The target level of relative abundance is similar to that measured at other Great Lakes sites where natural reproduction has occurred.

**Results:** Spring gill net assessments indicate that overall abundance remains low and below the target level of > 25 lake trout/ 1000 ft of net (horizontal line) lake wide (Figure 1) and in most statistical districts (Figure 2, 3). The Southern Refuge and Illinois waters continue to have the highest relative abundance of lake trout compared to other areas.

*Figure 1. Lakewide relative abundance of lake trout, spring 1998-2006.*

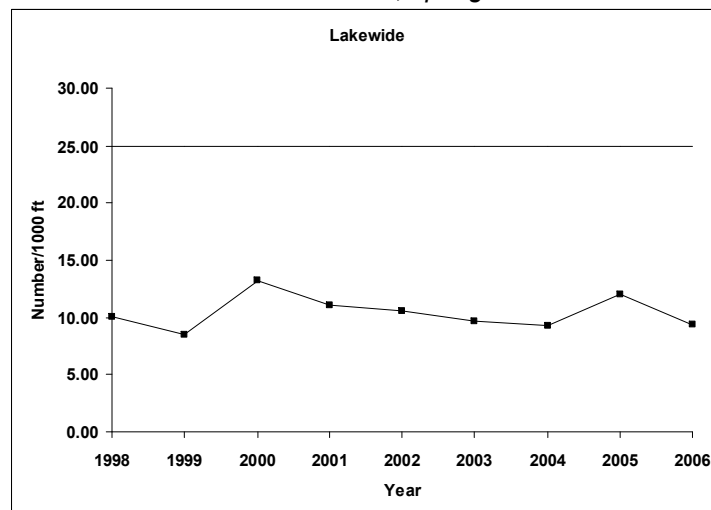


Figure 2. Statistical districts for lake trout management in Lake Michigan.

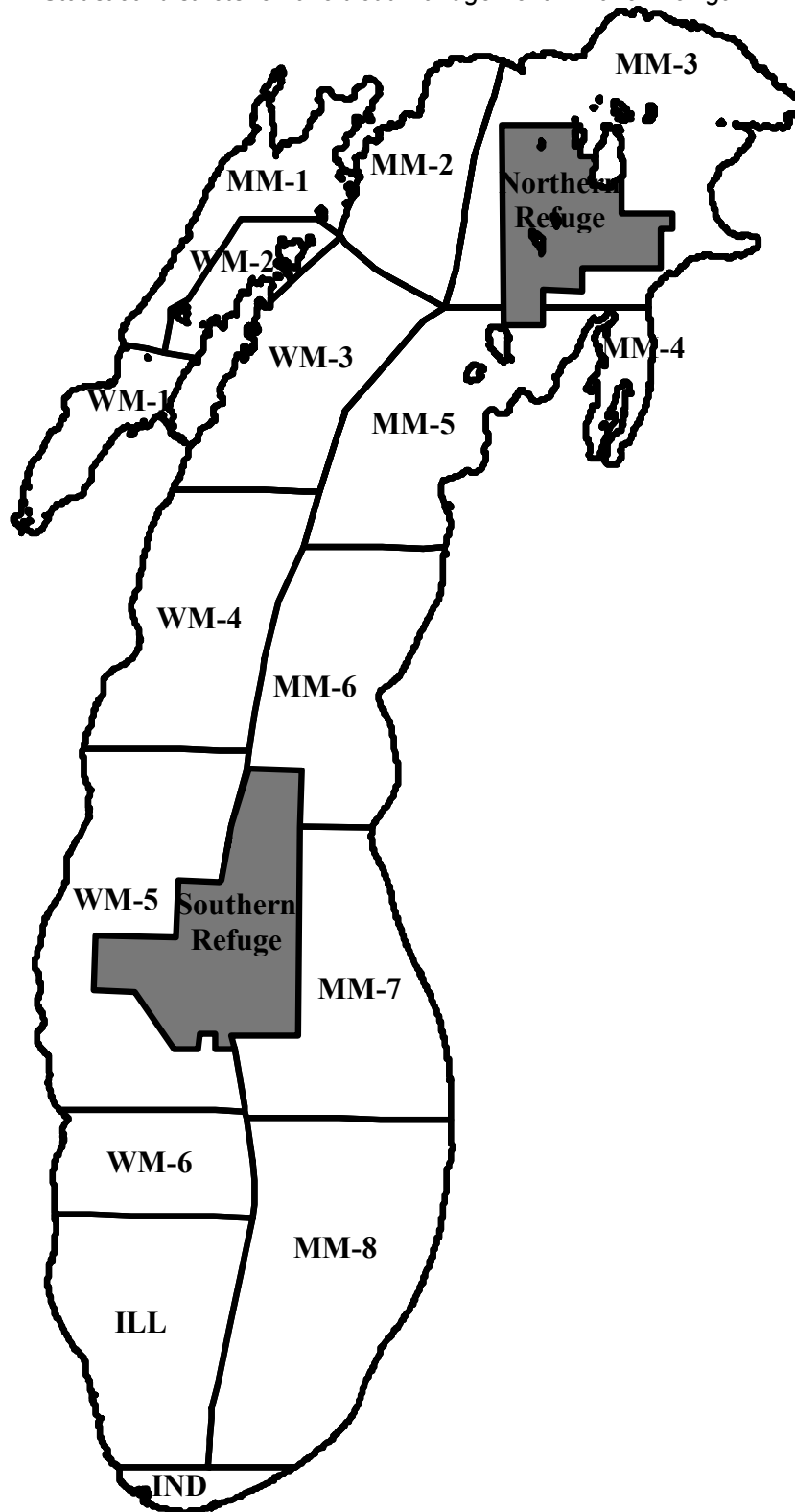


Figure 3. Relative abundance of lake trout by statistical district, spring 1998-2006

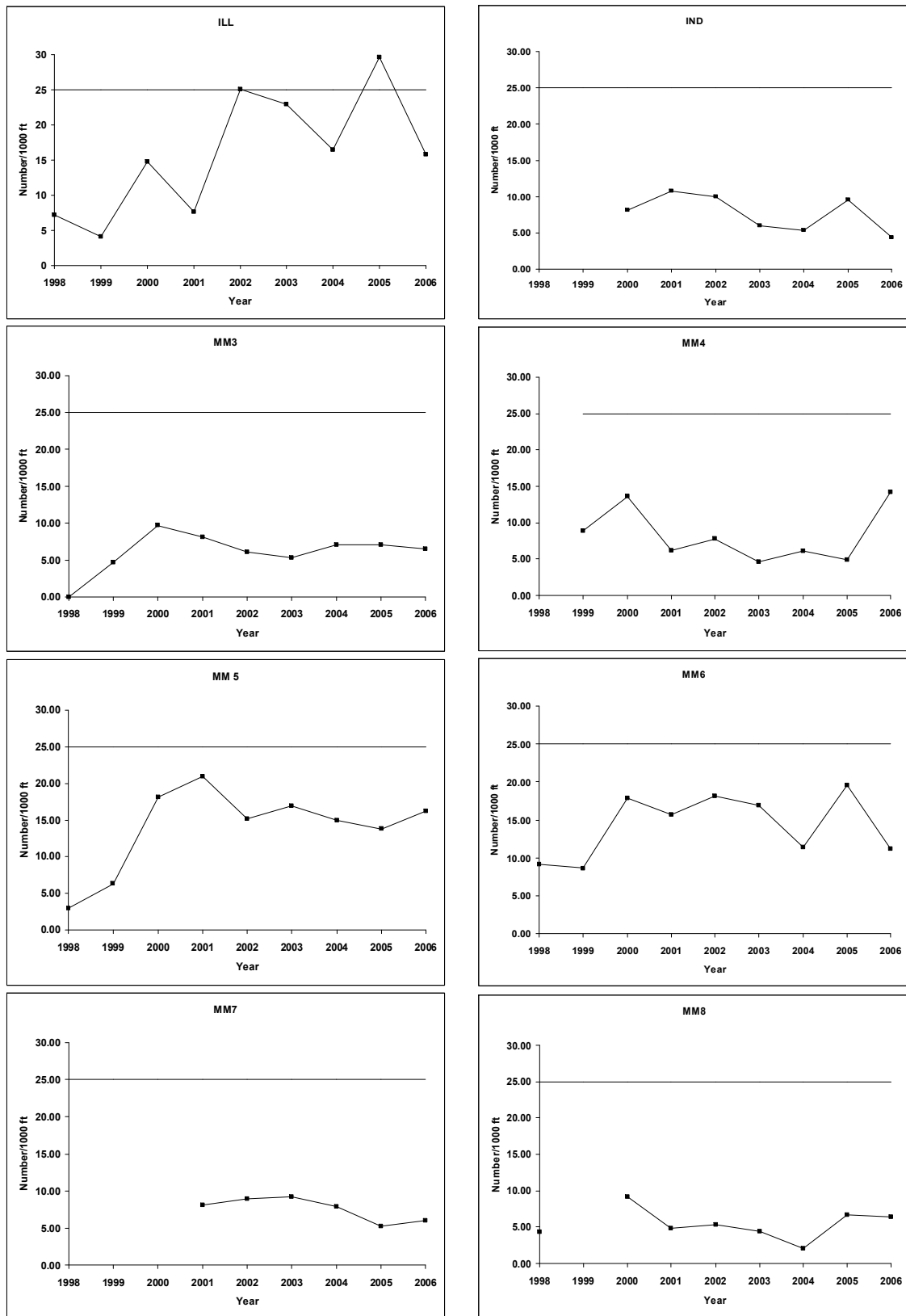
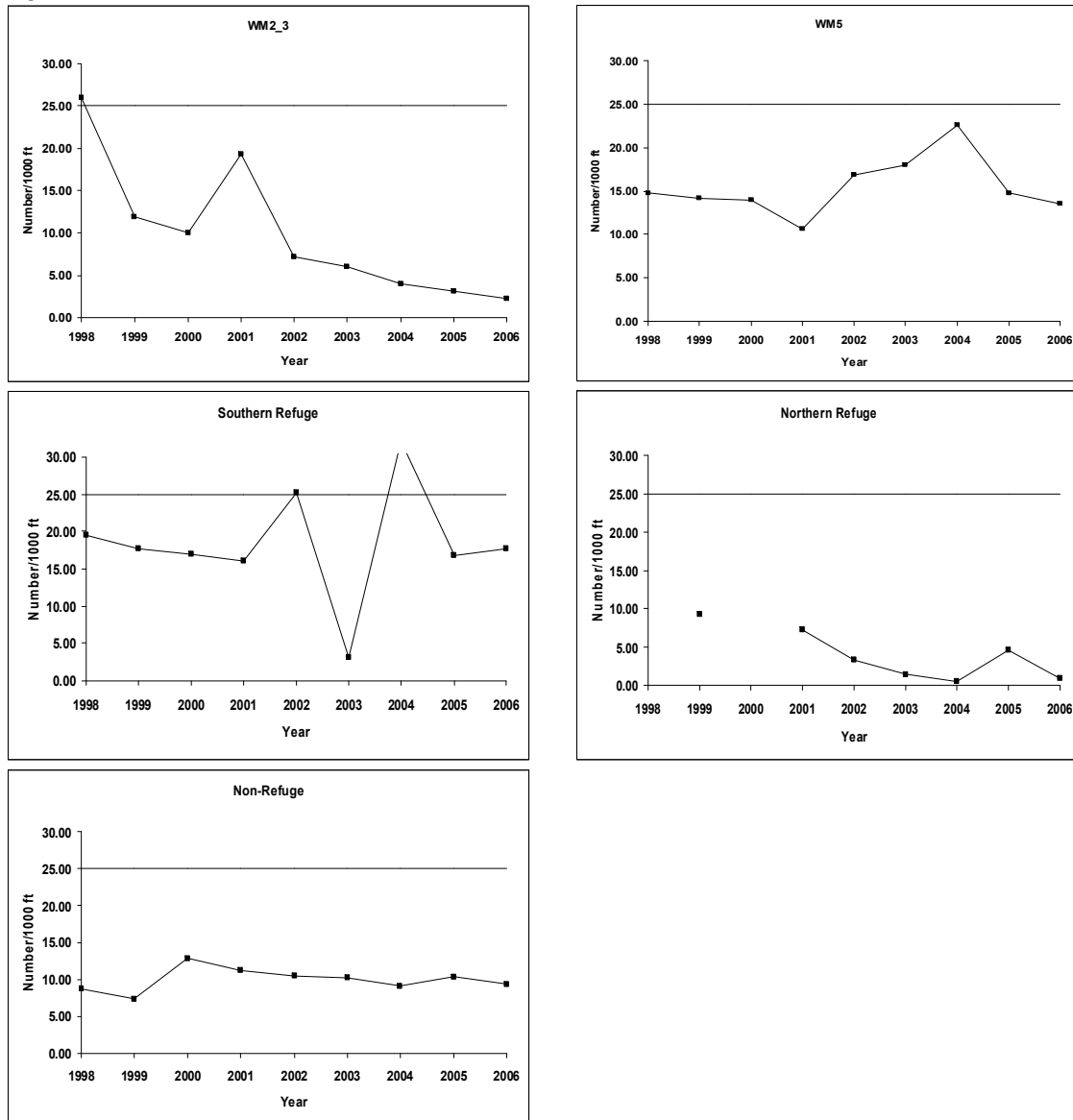


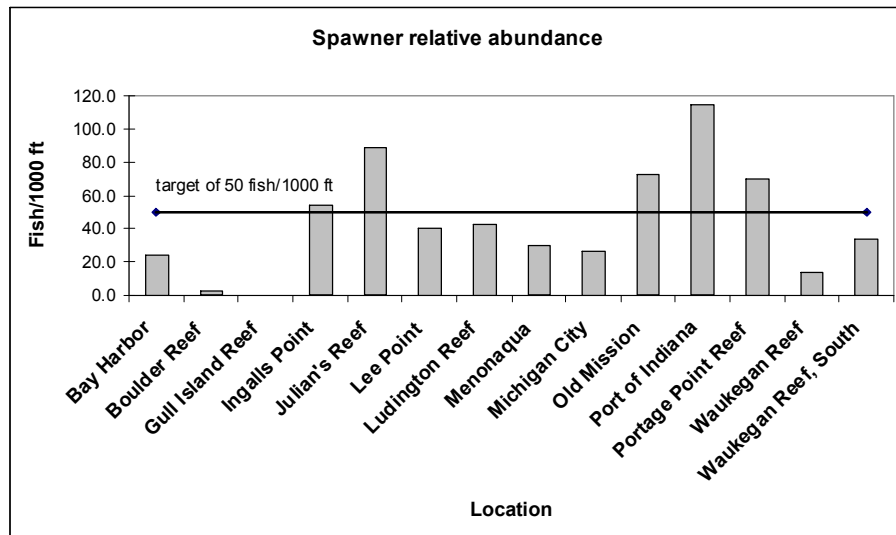
Figure 3 continued.



Objective 3 (Increase adult abundance): By 2018, increase the abundance of adults in refuges and high-priority areas to a minimum catch-per-effort > 50 fish/1000 ft of graded large-mesh (4.0-6.0 inch) gill net fished on spawning reefs.

Results: Only 5 of 14 spawning areas sampled in 2006 met or exceeded the target (Figure 4). Abundance of adult fish are low in many areas and likely inadequate to result in egg deposition rates that could overcome impediments to restoration. The lowest relative abundance measures are at Boulder and Gull Island Reefs within the Northern Refuge and correspond with over all low densities of lake trout measured in the spring (Figure 3).

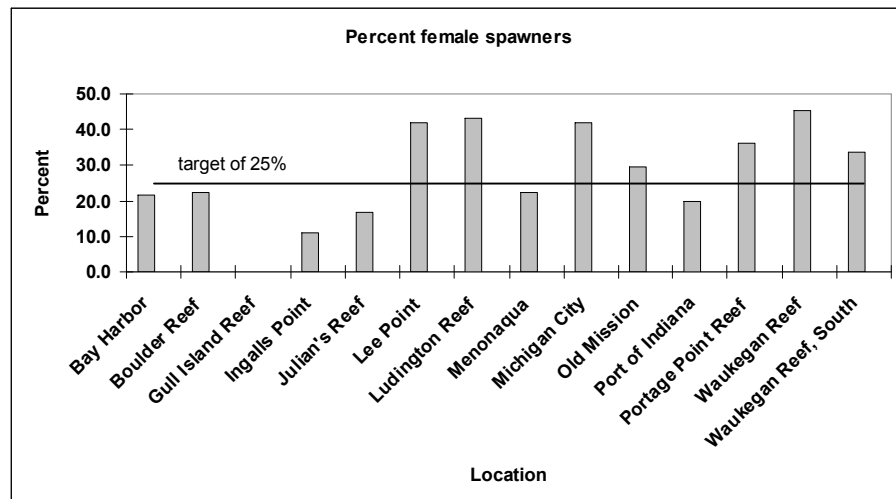
Figure 4. Relative abundance of lake trout spawners by location in 4.5-6.0 inch mesh gill nets in fall, 2006.



Objective 4 (Build spawning populations): By 2020, spawning populations in areas stocked prior to 2006 should be at least 25% females and contain 10 or more age groups older than age-7. These milestones should be achieved by 2030 in areas stocked after 2006.

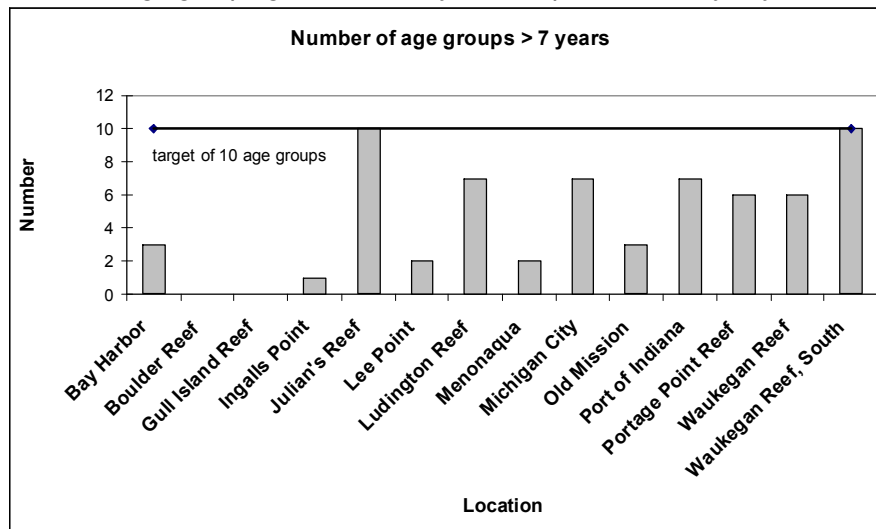
Results: Most sites sampled in 2006 were close to or exceeded the target for female percentage (Figure 5).

Figure 5. Percentage of fall spawners that were female by location, fall 2006.



Age compositions of spawning lake trout in 2006 were far younger than required, and only 2 sites in Illinois waters met the target of 10 or more age groups older than age-7 (Figure 6).

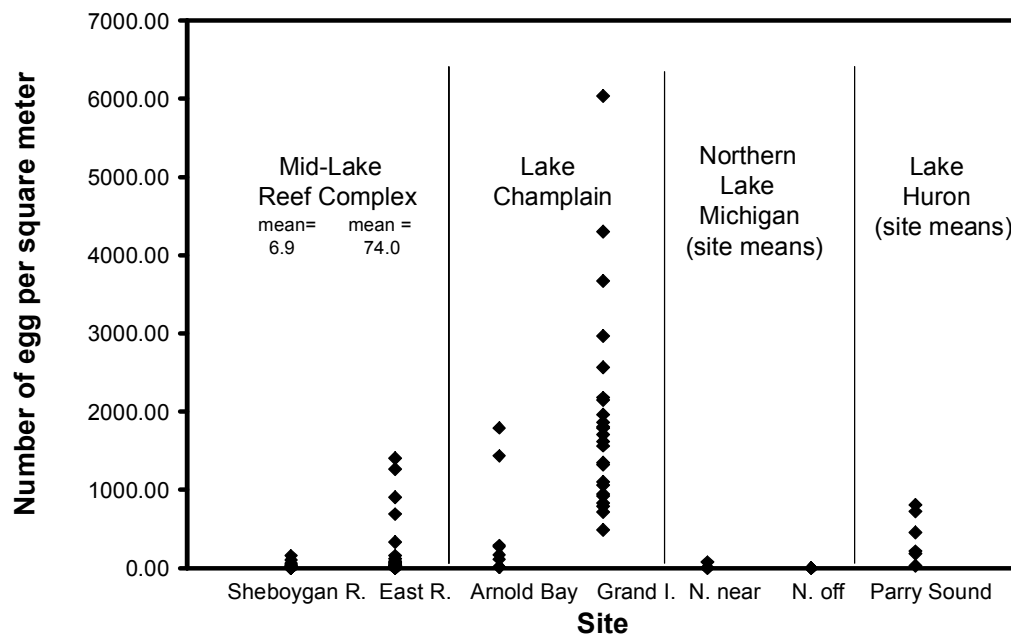
Figure 6. Number of age groups greater than 7 years in spawner surveys by location, fall 2006.



**Objective 5 (Detect egg deposition):** By 2015, detect a minimum density of 500 viable eggs/m<sup>2</sup> (eggs with thiamine concentrations > 4 nmol/g) in previously stocked areas. This milestone should be achieved by 2025 in newly stocked areas.

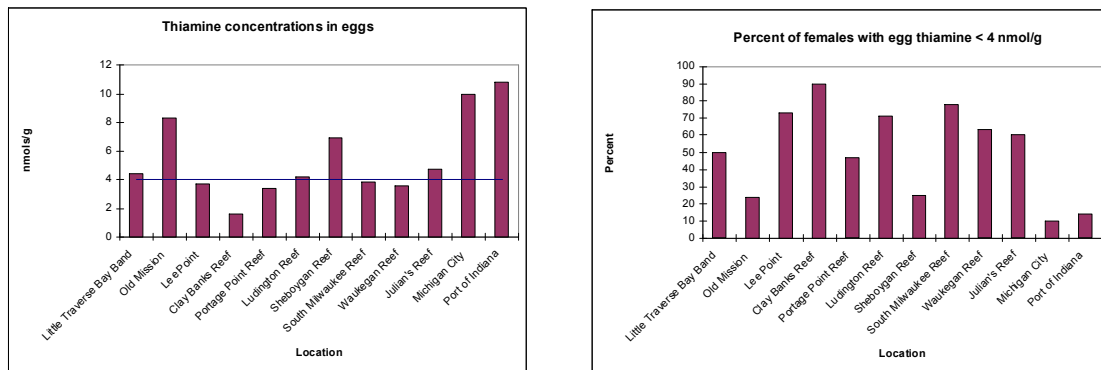
**Results:** Exploratory sampling conducted by Ellen Marsden and John Janssen at the MidLake Reef Complex in fall 2006 indicate that egg deposition there is below the target of 500 egg/m<sup>2</sup> at both the Sheboygan and East Reefs, albeit higher than sites previously sampled in northern Lake Michigan and reported by Jonas et al. (2005) (Figure 7).

Figure 7. Comparison of lake trout eggs densities from Lake Michigan with other sites.



Mean total thiamine levels were greater than 4 nmol/g at 5 of 12 locations where measurements were made in 2006 however most sites had more than 40% of females with eggs with total thiamine levels less than 4 nmol/g (Figure 8)(source: Jacques Rinchard, U.S. Geological Survey, Ann Arbor, MI). Total amelioration from Early Mortality Syndrome may not occur unless egg thiamine levels are higher than 4 nmol/gram.

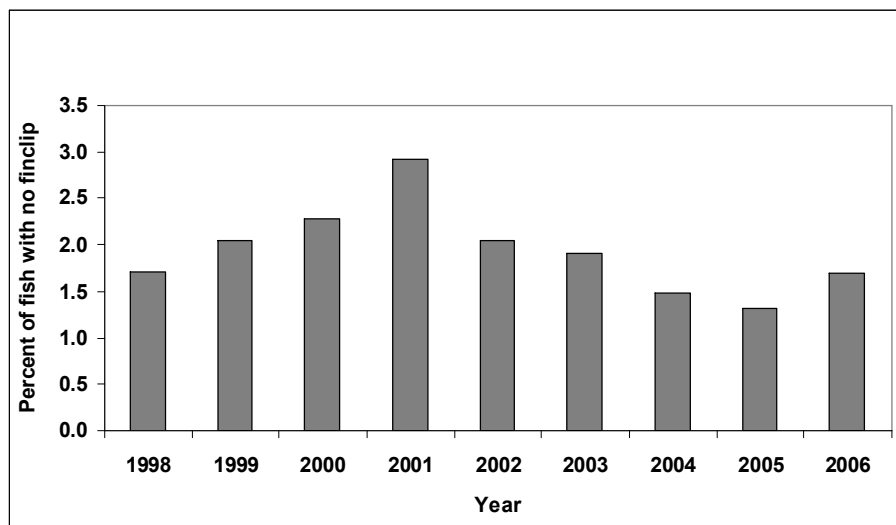
Figure 8. Thiamine concentrations of lake trout eggs, and percent of females with thiamine concentrations < 4 nmol/g by site, fall 2006.



Objective 6 (Detect recruitment of wild fish): Recruitment of wild lake trout should occur as follows: by 2020 detect age-1 fish in bottom trawls, by 2023 detect age-3 fish in spring graded-mesh-gill-net assessments, and by 2028 consistently detect sub-adults in refuges and high-priority areas.

Results: Less than 2% of lake trout of all ages captured in 2006 in the spring were those that had no fin clip, which indicates little natural reproduction (Figure 9).

Figure 9. Percentage of lake trout captured in spring without fin-clips. Lack of a fin-clip could suggest that the fish was produced in the lake.



Objective 7 (Achieve restoration): By 2035, 75% or more of the lake trout in deep- and shallow-water habitats should be age-10 and younger and of wild origin. At this time these populations will be declared rehabilitated.

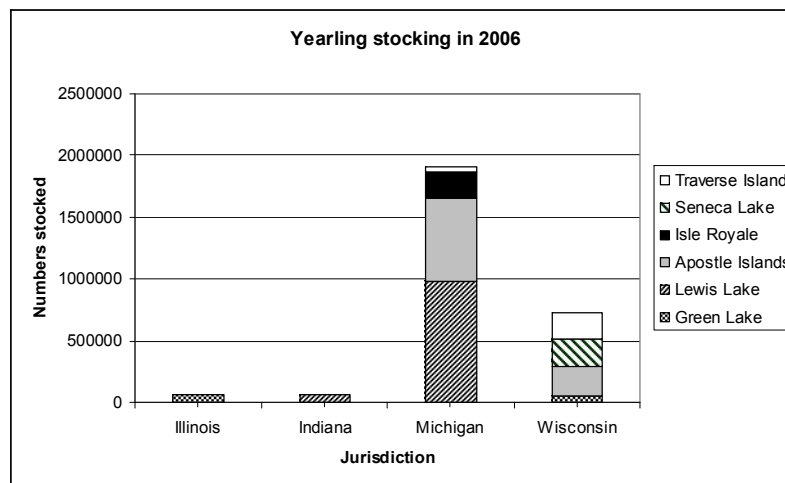
Results: Populations far from all targets.

### Lake trout stocking

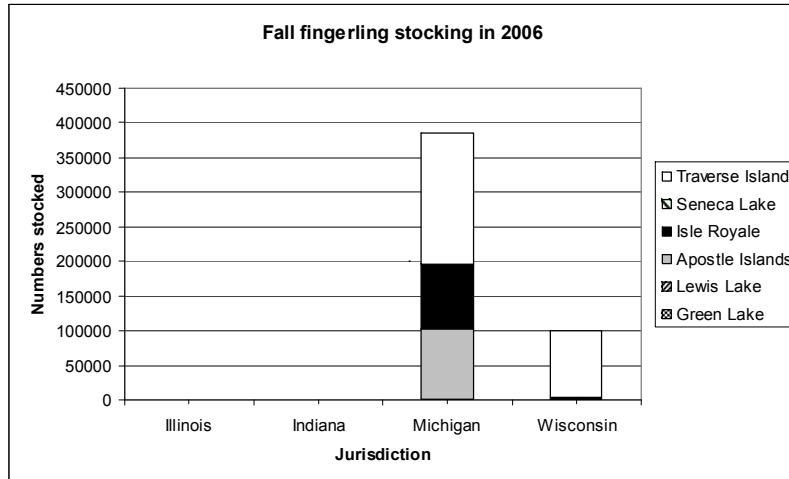
A total of 2.77 million yearling (14-16 months old) lake trout of five strains of the 2005 year class was stocked into Lake Michigan in 2006. Stocking totals for each state jurisdiction were 67,849 fish in Illinois, 59,547 in Indiana, 1,912,082 in Michigan and 730,079 in Wisconsin. All fish and received an LP fin clip; no fish with AD fin clip and coded wire tags were stocked pending the implementation of the new restoration plan now under review. In addition to the yearly stocking, 486,000 fall fingerlings of three strains were stocked into Michigan and Wisconsin waters.

Strain compositions will change in the future in response to results from coded wire tag returns that measure post-release survival. Based on poor returns of the Isle Royale strain and our inability to improve the genetic diversity of the Green Lake strain, these two strains will be discontinued and production of Lewis Lake, Seneca and Apostle Islands fish will be increased. The Traverse Island Strain will be discontinued also since this strain is genetically and ecologically similar to the Apostle Islands strain, which can be more easily supported.

*Figure 10. Spring yearling and fall fingerling lake trout stocking in Lake Michigan, 2006.*







### Literature cited

- Bronte, C. R., C.C. Krueger, M.E. Holey, M.L. Toneys, R.L. Eshenroder, and J.L. Jonas. (In review) A lake trout restoration plan for Lake Michigan, 2005-2020. 62 pp.
- Jonas, J. L., R. M. Claramunt, J. F. Fitzsimons, J. E. Marsden and B. J. Ellrott 2005. Estimates of egg deposition and effects of lake trout (*Salvelinus namaycush*) egg predators in three regions of the Great Lakes. *Can. J. Fish. Aquat. Sci.* 62:2254-2264.

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